

Statement of the American Lung Association on

**EPA's Integrated Science Assessment for
Oxides of Nitrogen -- Health Criteria**

**(First External Review Draft, November 2013)
EPA/600/R-13/202**

Docket ID: EPA-HQ-ORD-2013-0232

**Deborah Shprentz
Consultant to the American Lung Association**

March 12, 2014

Good afternoon. Thank you for the opportunity to present some comments on EPA's first draft Integrated Science Assessment for Oxides of Nitrogen, on behalf of the American Lung Association.

The ISA is a Rigorous and Transparent Assessment

We would like to commend EPA for its rigorous and transparent assessment in this first draft ISA.

The preamble of the draft document explicitly lays out the process of ISA development in a clear, transparent way. It clearly indicates the how studies were selected for review and the criteria that were used to evaluate the scientific quality of the studies.

Importantly, the document considers studies looking at the health impacts of personal exposures and indoor exposures to nitrogen dioxide. We consider this important evidence that is critical to a comprehensive evaluation of the effects of outdoor NOx concentrations.

In similar vein, EPA should give greater weight to the traffic studies. In light of the scope of the exposures, the documented harm from NO₂, and the lifelong impact particularly on the children exposed,

The weight of evidence approach for assessing causality is clearly articulated and is consistent with the recommendations of leading scientific bodies such as the Institute of Medicine and the Centers for Disease Control and Prevention.

We have identified about 40 studies in-press or published since the completion of the first draft that provide critical additional evidence of adverse health effects of nitrogen dioxide air pollution. These studies should be evaluated for inclusion in the second draft, but EPA must set a cut-off date, such as following the review of the second draft, so that the review process can move toward completion in a timely fashion.

EPA's causal findings need to be re-evaluated in light of substantial new evidence that short- and long-term exposures of NO₂ are associated with premature mortality, cardiovascular effects, respiratory disease, cancer, reproductive effects, immune system responses, neurological deficits, and other health problems.

For instance, a recently published meta-analysis reported that an independent effect of NO₂ emerged from multi-pollutant models. The meta-analysis concluded that evidence of a long-term effect of NO₂ on mortality was great as that of PM_{2.5}.¹

Susceptible Populations

The draft ISA concludes that children and older adults are at increased risk for NO₂ health effects. Additional elevated risk factors are living near major roads, and pre-existing asthma, COPD, and other factors.

Another population that should be evaluated for potential susceptibility are people that are overweight or obese. This factor has been ignored in the recent review of the PM and the ozone NAAQS, and it should be considered here. A recent publication reports that overweight and obese people have elevated breathing rates, increasing their exposure to air pollutants.² A review of the literature finds that obesity impacts breathing mechanics and gas exchange in numerous ways, and that

¹ Annunziata Faustini, Regula Rapp, and Francesco Forastiere. Nitrogen dioxide and mortality: review and meta-analysis of long-term studies. *Eur. Respir. J.* published 20 February 2014, 10.1183/09031936.00114713

² Pierre Brochu, Michèle Bouchard, Sami Haddad. Physiological Daily Inhalation Rates for Health Risk Assessment in Overweight/Obese Children, Adults, and Elderly. *Risk Analysis*, 22 October 2013. DOI: 10.1111/risa.12125.

air pollution exposures may place an additional burden on the altered physiological, morphological and biochemical states typical of obese populations.³

NO₂ Causes Adverse Respiratory Effects

Based on a transparent analytical approach, the draft ISA reaches important new conclusions about the toxicity of nitrogen dioxide (NO₂).

We concur that the evidence supports a causal relationship between short-term exposures and respiratory effects. We are concerned with studies showing that NO₂ exposure exacerbates asthma, and increases respiratory symptoms, triggering increased hospital and emergency department visits for asthma. While confounding by co-pollutants is always a consideration, we concur that recent studies point to the independent role of NO₂ as distinct from other air pollutants.

Of particular concern, are studies indicating positive associations with health endpoints such as hospital admissions, when the mean 1-hour maximum NO₂ concentration was between 22 to 66 ppb, and maximum concentrations ranged from 59 to 298 ppb.

Earlier evidence from chamber studies found increased airway responsiveness of adults with asthma after 1-hour exposures to 100 ppb, calling into question the adequacy of the current hourly standard of 100 ppb.

We are particularly concerned about the role of NO₂ in the development of asthma in children. We concur with the conclusion that long-term exposures are likely to cause adverse respiratory effects.

³ Koman PD. How Does the Obesity Epidemic Affect Pulmonary Risk from Air Pollution. University of Michigan Risk Science Center Occasional Papers, 12.1.2012.